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D scription

Field of Invention

This invention relates to blister packages, and more particularly, to a blister package for storing and dispensing hydrophilic contact lenses which are maintained in an aqueous solution.

Background of the Invention

Soft, hydrophilic contact lenses are manufactured from hydrophilic polymeric materials such as copolymers of hydroxyethyl methacrylate, and may contain from 20 to 90 percent or more water, depending on polymer composition. Such lenses must be stored in a sterile aqueous solution, usually isotonic saline, to prevent dehydration and to maintain the lenses in a ready to wear condition.

Common practice has been for lens manufacturers to use a stoppered glass bottles as the storage and shipping container for each individual lens. The standard contact lens bottle is approximately 10cc in volume, is sealed with a silicone stopper and provided with a metal foil overcap safety seal. Each bottle contains approximately 7cc of saline and a single contact lens which is identified on the label of the bottle. When the lens is to be removed for fitting on a patient, the practitioner must first tear and remove the metal safety seal, then remove the stopper, and finally remove the lens with a plastic tweezer.

Packaging contact lenses in glass bottles is expensive due to the cost of bottles, stoppers and seals, and shipping is expensive due to the weight of the glass and saline. Bottles are also subject to breakage if accidentally dropped during handling, and removing the lens from the bottle with tweezers is inconvenient since the lens is nearly invisible when submerged in saline.

It is accordingly an object of the present invention to provide an improved package for storing, shipping and dispensing hydrophilic contact lenses. It is a further object of this invention to provide a lens package which allows for improved efficiencies in the lens manufacturing process. It is a yet further object of this invention to provide an inexpensive package which allows for convenient removal of the contact lens. These and other objects of this invention will be apparent from the ensuing description and claims.

Summary of Invention

The package of the present invention is a shaped blister package covered with a flexible sheet material which can be stripped from the package to gain access to the lens. The molded

base or blister portion of the package includes a cavity in which is housed the contact lens and saline solution, and an outward extending flange around the perimeter of the cavity to which the cover material is sealed. The cavity of the package, the shape of which does not conform to that of the lens, is defined by a bottom surface and side walls extending between the bottom surface and the peripheral flange. A portion of the side wall is inclined away from the bottom surface to form a ramp or inclined surface between the bottom of the cavity and the flange. The cover material which is substantially flat is sealed to the flange around the cavity by means which allow the cover to be readily stripped or peeled from the flange. The flange adjacent the inclined surface and the overlying cover material preferably extend outward beyond the seal area to provide unsealed edges which may be gripped to facilitate removal of the cover. The lens free within the cavity, normally rests on the bottom surface of the cavity in which position its dimensions preclude it from being in contact with the cover sheet.

The package according to the present invention is inexpensive, light in weight, and requires less saline for lens storage. The package is conveniently opened by stripping the cover from the flange to expose the cavity and the lens in a shallow bath of saline. The lens is conveniently removed by sliding the lens up the inclined surface using either tweezers or a finger.

The base portion of the package may be injection molded or thermoformed from any suitable thermoplastic sheet material such as polypropylene. The cover stock may be a laminate of polypropylene film and aluminum foil which can be heat sealed to the flange around the cavity of the package. Lens identification and other label information can be printed on the cover stock. Once the package is opened and sterility lost, the package is not amenable to reclosure.

Description of Drawings

- Fig. 1 is a phantom view in perspective of a package according to the present invention.
- Fig. 2 is a perspective view of the package of Fig. 1 with the cover partially removed.
- Fig. 3 is a side elevational plan view of the package of Fig. 1.
- Fig. 4 is a top plan view of the package of Fig. 1 with the cover removed.
- Fig. 5 is a top plan view of another embodiment of a package according to the present invention with the cover removed.

Fig. 6 is a top plan view of another embodiment of a package according to the present invention with the cover removed.

Fig. 7 is a side elevational view of the package of Fig. 6

Description of Embodiments

With reference to Fig. 1, there is illustrated a preferred embodiment of a package according to the present invention consisting of lower base portion 11 and cover member 12. The lower portion includes a cavity indicated generally as 13 which is formed by inclined side wall 14 and upstanding side walls 15. The cavity is surrounded by outward extending flange 16. Cover 12 is sealed to flange 16 around the opening of cavity 13 as indicated by seal line 17. Cavity 13 is sized to receive contact lens 19 and a sufficient quantity of saline 20 to completely submerge the lens.

As illustrated in Fig. 1, that portion of flange 16 and cover 12 adjacent inclined side wall 14 extends well beyond the area of seal 17. The unsealed edges of the flange and cover thereby provide gripping means whereby the cover may be readily stripped from the flange to gain access to cavity 13 and the lens contained therein. An opened package with the cover member still secured along the rear edge of the flange is illustrated in Fig. 2. The seal line between inclined side wall 14 and the unsealed edges of the cover and flange is preferably chevron shaped as illustrated in Fig. 1 and 2 for ease in opening the package since the chevron configuration allows for a more uniform stripping force to be applied, assuring that the package can be opened without spilling the contents.

Fig. 3 is a side plan view which most clearly illustrates the slope of inclined surface 14. Preferably, surface 14 should form an obtuse angle of from about 130 to 160 degrees with the plane of the bottom surface of cavity 13, and most preferably from about 140 to 150 degrees. A slope within this range allows the lens to be readily removed from the cavity without unduly increasing the volume of the cavity or the length of the seal line around the perimeter of the cavity. A typical contact lens has a diameter of from about 13 to 15 mm and a depth of from about 3 to 4 mm. A suitable cavity for such a lens is from 6 to 10 mm deep with a 20x20 mm bottom surface and an opening of about 20x30 mm. The outer dimension of such a package is approximately 3x6 cm.

Fig. 4 is a top plan view of the package of Fig. 1 with cover 12 removed to more clearly illustrate the configuration of cavity 13. Fig. 5 is a top plan view of another embodiment of a package wherein cavity 23 surrounded by flange 26 is defined by

semicircular upstanding side wall 25 merging into inclined side wall 34. Fig. 6 illustrates a further embodiment of the present invention wherein the bottom surface 38 of cavity 33 is concave. The concave surface encourages the lens contained in the cavity to rest on the bottom surface with the edges of lens extending upward, thereby increasing the ease with which the lens may be located and brought up to flange 36 of the package. The inclined sidewall surface may likewise be flat or concave as desired.

The lower portion 12 of the package according to the present invention is preferably produced by thermoforming polypropylene sheet material having a thickness of about 0.8 mm. Polypropylene is preferred for its good thermoforming properties, its ability to withstand heat sterilization at about 120° C. with little or no shrinkage or distortion, and its ability to be heat sealed to cover stock material.

The cover stock is preferably an adhesive laminate of aluminum foil and polypropylene film which can be heat sealed to the base section of the package to provide an air tight seal, and yet be readily stripped from the package when the package is to be opened. The aluminum foil is preferably coated or lacquered on the opposite surface to provide label identification and a receptive surface for later imprinting lens parameters such as diameter, power, and base curve.

The packages of the present invention may be constructed of materials other than those identified herein although materials as identified provide good results. Packages constructed of materials such as polyethylene which are less heat resistant than polypropylene and not suitable for heat sterilization may be radiation or gas sterilized, optionally with aseptic assembly techniques.

In addition to withstanding sterilization temperatures of about 120° C., the sealed packages for hydrophilic contact lenses must be impermeable to bacteria to preserve sterility, have a negligible moisture vapor transmission rate to avoid loss of water, and be able to maintain the lens in its original condition for the stated shelf life of the product, usually 2 to 4 years. The package materials and the packaging procedures must be selected accordingly.

While the packages of the present invention as illustrated herein have been generally rectangular in shape with a rectangular or elongated cavity, it will be apparent that many other sizes and shapes may be utilized without departing from the scope of the present invention. The packages of the present invention are characterized by a storage cavity having an inclined wall or ramp extending from the bottom of the cavity to a peripheral outstanding flange, and a removable cover sheet sealed to said flange around the perimeter of said cavity. Materi-

als, methods of fabrication and package configuration may vary according to the specific needs and desires of the practitioner.

Claims

1. A blister package for an optical lens comprising a base portion (11) and a cover sheet (12) characterized by,
 - said base portion (11) including a cavity (13) in which is housed a hydrophilic contact lens (19) and sterile aqueous solution, said base portion also including a flange (16) extending outward around the periphery of said cavity (13),
 - said cavity (13) being defined by a bottom surface, upstanding side walls (15) and a side wall surface inclined (14) away from said bottom surface,
 - said cover sheet (12) being substantially flat and releasably sealed to said flange (16) around the perimeter of said cavity (13),
 - and wherein the shape of the cavity (13) does not conform to that of the lens (19) and wherein the lens (19) free within the cavity, normally rests on the bottom surface of the cavity (13) in which position its dimensions preclude it from being in contact with the cover sheet (12).
2. The package according to claim 1 in which the base portion (11) is a molded base, the side wall surfaces (14, 15) of said cavity (13) extend between said bottom surface and said flange (16), said side wall surface (14, 15) includes a portion (14) thereof inclined away from said bottom surface to form an obtuse angle with the plane of said bottom surface, said cover sheet (12) is flexible, and said cover sheet (12) and said flange (16) adjacent to the edge of said inclined side wall (14) surface extend outward to beyond the area of said seal (17), whereby the unsealed edges of said cover sheet (12) and said flange (16) afford gripping means for separating said cover sheet from said flange to expose said inclined wall (14) and said cavity (13).
3. The package of claim 1 or claim 2 wherein said inclined side wall (14) surface forms an angle of from about 130 to 160° with the plane of said bottom surface.
4. The package of any one of claims 1 to 3 wherein the bottom surface of said cavity (13) is flat.
5. The package of any one of claims 1 to 4 wherein the inclined side wall (14) surface is flat.
6. The package of any one of claims 1 to 5 wherein said cavity (13) is rectangular and is defined by three upstanding side walls (15) and one inclined side wall (14).
7. The package of any one of claims 1 to 3 wherein the bottom surface of said cavity (13) is concave.
8. The package of any one of claims 1 to 3 and 7 wherein the inclined side wall (14) surface is concave.
9. The package of any one of claims 1 to 3, 7 and 8 wherein said cavity (13) is defined by a semicircular upstanding side wall (15) merging into an inclined side wall (14).
10. The package of any one of claims 1 to 9 wherein said molded base (11) is a thermoformable polypropylene polymer.
11. The package of any one of claims 1 to 10 wherein said cover sheet (12) is heat sealed to said flange (16).
12. The package of claim 11 wherein said cover sheet (12) is an adhesive laminate of aluminum foil and polypropylene film.
13. The package of claim 11 or claim 12 wherein said heat seal (17) has a chevron configuration adjacent to said unsealed edges of said cover sheet (12) and said flange (16).
14. A process for making a blister package for a lens comprising a base portion (11) and a cover sheet (12) characterized by,
 - placing a hydrophilic contact lens (19) and sterile aqueous solution in the cavity (13) of said base portion (11), said base portion (11) also including a flange (16) extending outward around the periphery of said cavity (13), the cavity (13) having a shape which does not conform to that of the lens (19) and
 - said cavity (13) being defined by a bottom surface, upstanding side walls (15) and a side wall surface inclined (14) away from said bottom surface,
 - releasably sealing the cover sheet (12) to the flange (16), said cover sheet (12) being substantially flat, and
 - wherein the lens (19) free within the cavity, normally rests on the bottom surface of the

cavity (13) in which position its dimensions preclude it from being in contact with the cover sheet (12).

15. A process according to claim 14 wherein the base portion cavity, cover sheet and flange are as defined in any one of claims 1 to 13.

Patentansprüche

1. Blisterpackung für eine optische Linse, bestehend aus einem Basisteil (11) und einer Deckschicht (12), dadurch gekennzeichnet, daß der Basisteil (11) einen Hohlraum (13) umfaßt, der eine hydrophile Kontaktlinse (19) und eine sterile wässrige Lösung enthält, wobei der Basisteil auch einen Flansch (16) umfaßt, der sich außen rund um den Umfang des Hohlraums (13) erstreckt, der Hohlraum (13) durch eine Grundfläche, aufragende Seitenwände (15) und eine Seitenwand (14) definiert ist, die sich von der Grundfläche weg schräg erstreckt, die Deckschicht (12) im wesentlichen flach ist und mit dem Flansch (16) rund um den Umfang des Hohlraums (13) lösbar versiegelt ist, und wobei die Form des Hohlraums (13) nicht mit derjenigen der Linse (19) übereinstimmt und die Linse (19) in dem Hohlraum freiliegt und normalerweise auf der Bodenfläche des Hohlraums (13) ruht, in welcher Position ihre Abmessungen eine Berührung mit der Deckschicht (12) ausschließen.
2. Packung nach Anspruch 1, bei der der Basisteil (11) eine geformte Basis ist, wobei die Seitenwandflächen (14, 15) des Hohlraums (13) sich zwischen der Grundfläche und dem Flansch (16) erstrecken, die Seitenwandfläche (14, 15) einen Teil (14) derselben umfaßt, der von der Grundfläche weg schräg verläuft, um einen stumpfen Winkel mit der Ebene der Bodenfläche zu bilden, wobei die Deckschicht (12) flexibel ist und die Deckschicht und der Flansch (16) nahe dem Rand der schrägen Seitenwandfläche (14) sich nach außen über den Bereich der Siegelung (17) hinaus erstreckt, wodurch die ungesiegelten Ränder der Deckschicht (12) und des Flansches (16) Greifmittel zum Abtrennen der Deckschicht von dem Flansch zwecks Freilegung der schrägen Wand (14) und des Hohlraums (13) bilden.
3. Packung nach Anspruch 1 oder Anspruch 2, bei der die schräge Seitenwandfläche (14) einen Winkel von etwa 130 bis 160° mit der Ebene der Bodenfläche bildet.

4. Packung nach einem der Ansprüche 1 bis 3, bei der die Bodenfläche des Hohlraums (13) eben ist.
5. Packung nach einem der Ansprüche 1 bis 4, bei der die schräge Seitenwandfläche (14) eben ist.
6. Packung nach einem der Ansprüche 1 bis 5, bei der der Hohlraum (13) rechtwinklig und durch drei aufragende Seitenwände (15) und eine schräge Seitenwand (14) definiert ist.
7. Packung nach einem der Ansprüche 1 bis 3, bei der die Bodenfläche des Hohlraums (13) konkav ist.
8. Packung nach einem der Ansprüche 1 bis 3 und 7, bei der die schräge Seitenwandfläche (14) konkav ist.
9. Packung nach einem der Ansprüche 1 bis 3, 7 und 8, bei der der Hohlraum (13) durch eine halbkreisförmige, aufragende Seitenwand (15) definiert ist, die in eine schräge Seitenwand (14) übergeht.
10. Packung nach einem der Ansprüche 1 bis 9, bei der die geformte Basis (11) ein warmverformbares Polypropylenpolymer ist.
11. Packung nach einem der Ansprüche 1 bis 10, bei der die Deckschicht (12) mit dem Flansch (16) heißversiegelt ist.
12. Packung nach Anspruch 11, bei der die Deckschicht (12) ein Kleberlaminat aus einer Aluminiumfolie und einem Polypropylenfilm ist.
13. Packung nach Anspruch 11 oder Anspruch 12, bei der die Heißsiegelung (17) eine Chevron-Konfiguration nahe der unversiegelten Ränder der Deckschicht (12) und des Flansches (16) hat.
14. Verfahren zum Herstellen einer Blisterpackung für eine Linse, bestehend aus einem Basisteil (11) und einer Deckschicht (12), gekennzeichnet durch
 - Plazieren einer hydrophilen Kontaktlinse (19) und einer sterilen wässrigen Lösung in dem Hohlraum (13) des Basisteils (11), wobei der Basisteil (11) auch einen Flansch (16) umfaßt, der sich außen um den Umfang des Hohlraums (13) herum erstreckt, und der Hohlraum (13) eine Form hat, die derjenigen der Linse (19) nicht entspricht, und
 - der Hohlraum (13) durch eine Grundfläche,

aufragende Seitenwände (15) und eine Seitenwandfläche (14) défini est, die sich schräg von der Grundfläche weg erstreckt, lösbares Versiegeln der Deckschicht (12) mit dem Flansch (16), wobei die Deckschicht (12) im wesentlichen eben ist, und wobei die Linse (19) innerhalb des Hohlraums frei ist und normalerweise auf der Bodenfläche des Hohlraums (13) ruht, wobei in dieser Position ihre Abmessungen sie an einer Berührung mit der Deckschicht (12) hindern.

15. Verfahren nach Anspruch 14, bei dem der Hohlraum im Basisteil, die Deckschicht und der Flansch in irgendeinem der Ansprüche 1 bis 13 definiert sind.

R revendications

1. Un emballage souple pour une lentille optique comprenant une partie de base (11) et une feuille de recouvrement (12), caractérisé par le fait que ladite partie de base (11) comprend une cavité (13) dans laquelle est logée une lentille de contact hydrophile (19) et une solution aqueuse stérile, ladite partie de base comprenant également un rebord (16) s'étendant vers l'extérieur autour de la périphérie de ladite cavité (13), le fait que ladite cavité (13) est définie par une surface de fond, des parois latérales verticales (15) et une surface de paroi latérale inclinée (14) par rapport à ladite surface de fond, le fait que ladite feuille de recouvrement (12) est substantiellement plate et collée de façon à pouvoir être détachée dudit rebord (16) autour du périmètre de ladite cavité (13), et dans lequel la forme de la cavité (13) n'épouse pas celle de la lentille (19) et dans lequel la lentille (19), libre à l'intérieur de la cavité, repose normalement sur la surface de fond de la cavité (13), position dans laquelle ses dimensions l'empêchent d'être en contact avec la feuille de recouvrement (12).
2. L'emballage selon la revendication 1, dans lequel la partie de base (11) est une base moulée, les surfaces de parois latérales (14, 15) de ladite cavité (13) s'étendent entre ladite partie de fond et ledit rebord (16), ladite surface de paroi latérale (14, 15) comprend une partie (14) de celle-ci qui est inclinée par rapport à la partie de fond afin de former un angle obtus avec le plan de ladite surface de fond, ladite feuille de recouvrement (12) et ledit rebord (16) qui est en position adjacente par rapport au bord de ladite surface de paroi latérale (14) inclinée s'étend vers l'extérieur jusqu'au delà

de la zone dudit collage (17), ce qui a pour résultat que les bords non collés de ladite feuille de recouvrement (12) et ledit rebord (16) fournissent des moyens de prise pour séparer ladite feuille de recouvrement dudit rebord afin d'exposer ladite paroi inclinée (14) et ladite cavité (13).

3. L'emballage selon la revendication 1 ou la revendication 2, dans lequel la surface de ladite paroi latérale inclinée (14) forme un angle d'environ 130 à 160° avec le plan de ladite surface de fond.
4. L'emballage selon l'une des revendications 1 à 3, dans laquelle la surface de fond de ladite cavité (13) est plate.
5. L'emballage selon l'une des revendications 1 à 4, dans lequel la surface de la paroi latérale inclinée (14) est plate.
6. L'emballage selon l'une des revendications 1 à 5, dans lequel ladite cavité (13) est rectangulaire et est définie par trois parois latérales verticales (15) et une paroi latérale inclinée (14).
7. L'emballage selon l'une des revendications 1 à 3, dans lequel la surface de fond de ladite cavité (13) est concave.
8. L'emballage selon l'une des revendications 1 à 3 et 7, dans lequel la surface de la paroi latérale inclinée (14) est concave.
9. L'emballage selon l'une des revendications 1 à 3, 7 et 8, dans lequel ladite cavité (13) est définie par une paroi latérale verticale semi-circulaire (15) se fondant dans une paroi latérale inclinée (14).
10. L'emballage selon l'une des revendications 1 à 9, dans lequel la base moulée (11) est un polymère de polypropylène thermoformable.
11. L'emballage selon l'une des revendications 1 à 10 dans lequel ladite feuille de recouvrement (12) est thermoscellées audit rebord (16).
12. L'emballage selon la revendication 11, dans lequel ladite feuille de recouvrement (12) est un laminé adhésif de feillard d'aluminium et de film de polypropylène.
13. L'emballage selon la revendication 11 ou la revendication 12, dans lequel ledit collage thermique (17) a une configuration en chevrons

et est en position adjacente auxdits bords non scellés de ladite feuille de recouvrement (12) et dudit rebord (16).

14. Un procédé de fabrication d'un emballage 5
souple pour une lentille, comprenant une partie
de base (11) et une feuille de recouvrement
(12), caractérisé par,
le fait de placer une lentille de contact hydro -
phile (19) et une solution aqueuse stérile dans 10
la cavité (13) de ladite partie de base (11),
ladite partie de base (11) comprenant égale -
ment un rebord (16) s'étendant vers l'extérieur
autour de la périphérie de ladite cavité (13), la
cavité (13) ayant une forme qui n'épouse pas 15
celle de la lentille (19) et
par le fait que ladite cavité (13) est définie par
une surface de fond, des parois latérales ver -
ticales (15) et une surface de paroi latérale
inclinée (14) par rapport à ladite surface de 20
fond,
par le collage de la feuille de recouvrement
(12) au rebord (16) de telle sorte qu'on puisse
l'en retirer, ladite feuille de recouvrement (12)
étant substantiellement plate et 25
dans lequel la lentille (19), qui est libre à
l'intérieur de la cavité, repose normalement sur
la surface de fond de la cavité (13), position
dans laquelle ses dimensions l'empêchent
d'être en contact avec la feuille de recouvre - 30
ment (12).
15. Un procédé selon la revendication 14, dans
lequel la cavité de la partie de base, la feuille
de recouvrement et le rebord sont tels que 35
définis dans l'une des revendications 1 à 13.

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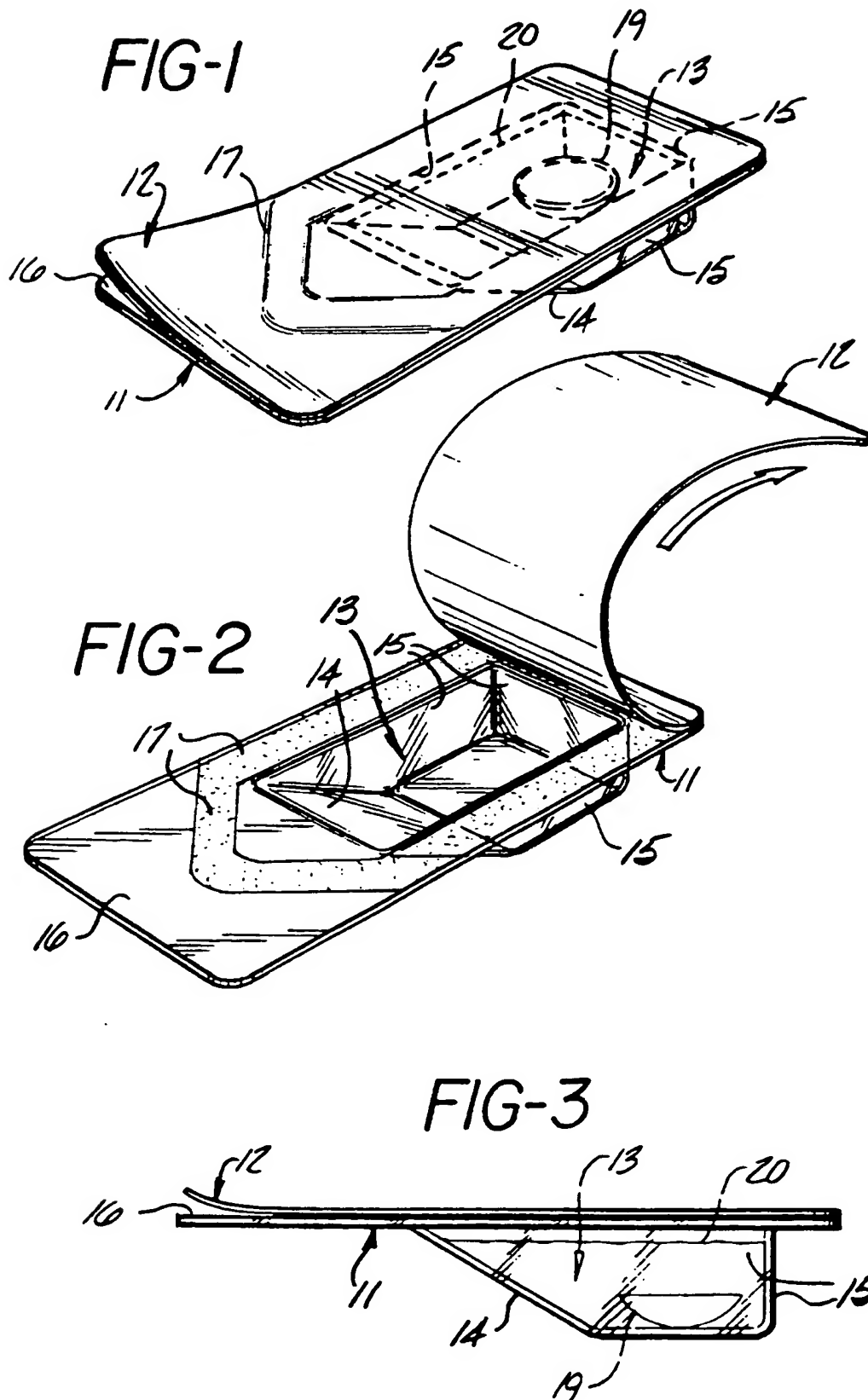


FIG-4

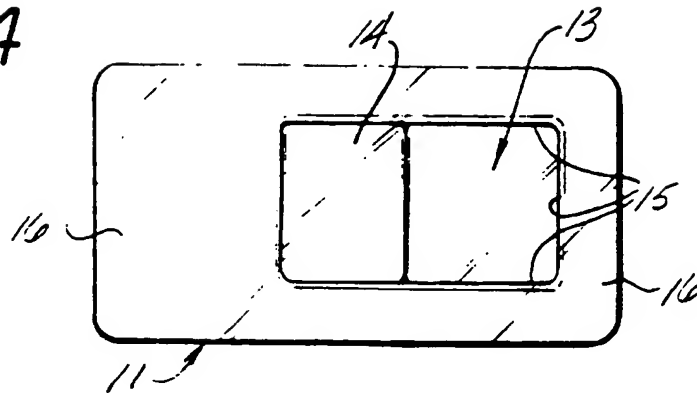


FIG-5

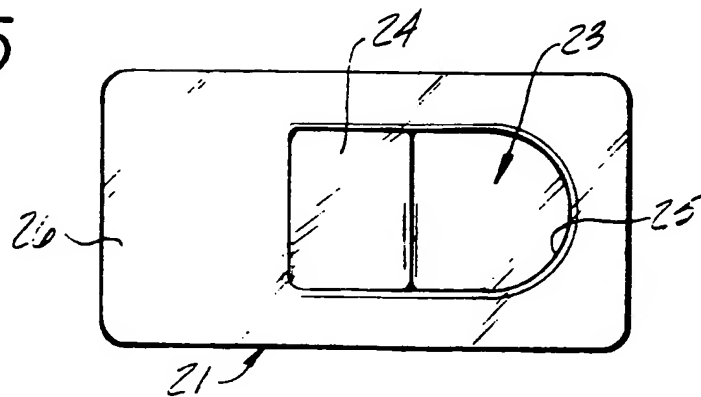


FIG-6

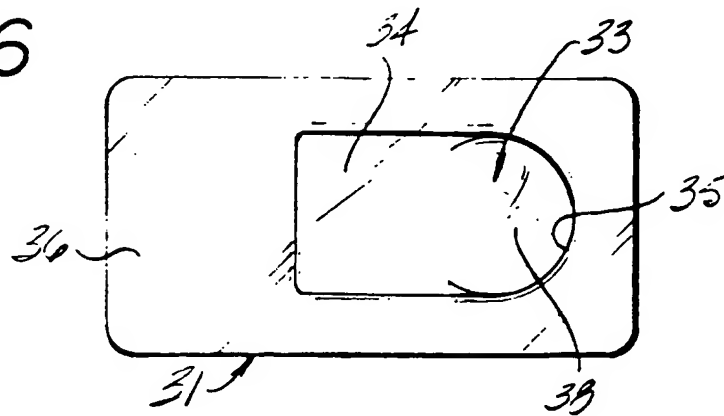


FIG-7

